



74 5

SEQUENCE LISTING

<110> Messier, Walter

Sikela, James M

<120> Methods to Identify Polynucleotide and Polypeptide
Sequences Which May Be Associated with Physiological
and Medical Conditions

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<151> 2000-06-09

<150> 09/240,915

<151> 1999-01-29

<150> 60/073,263

<151> 1998-01-30

<150> 60/098,987

<151> 1998-09-02

<150> 09/942,252

<151> 2001-08-28

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<170> PatentIn Ver. 2.0

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gtg cag gtg aca tgc agc acc tcc tgt gac cag ccc gac ttg ttg ggc 96

Val Gln Val Thr Cys Ser Thr Ser Cys Asp Gln Pro Asp Leu Leu Gly

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Ile Glu Thr Pro Leu Pro Lys Lys Glu Leu Leu Leu Gly Gly Asn Asn

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| tgc tat tca aac tgc cct gat ggg cag tca aca gct aaa acc ttc ctc | 240 |
| Cys Tyr Ser Asn Cys Pro Asp Gly Gln Ser Thr Ala Lys Thr Phe Leu | |
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| acc gtg tac tgg act cca gaa cgg gtg gaa ctg gca ccc ctc ccc tct | 288 |
| Thr Val Tyr Trp Thr Pro Glu Arg Val Glu Leu Ala Pro Leu Pro Ser | |
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| Trp Gln Pro Val Gly Lys Asp Leu Thr Leu Arg Cys Gln Val Glu Gly | |
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| Gly Ala Pro Arg Ala Asn Leu Thr Val Val Leu Leu Arg Gly Glu Lys | |
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| gag ctg aaa cgg gag cca gct gtg ggg gag ccc gct gag gtc acg acc | 432 |
| Glu Leu Lys Arg Glu Pro Ala Val Gly Glu Pro Ala Glu Val Thr Thr | |
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| acg gtg ctg gtg gag aga gat cac cat gga gcc aat ttc tcg tgc cgc | 480 |
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Ser Ala Pro His Gln Leu Gln Thr Phe Val Leu Pro Ala Thr Pro Pro

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Gln Leu Val Ser Pro Arg Val Leu Glu Val Asp Thr Gln Gly Thr Val

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Val Cys Ser Leu Asp Gly Leu Phe Pro Val Ser Glu Ala Gln Val His

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ctg gca ctg ggg gac cag agg ttg aac ccc aca gtc acc tat ggc aat 720

Leu Ala Leu Gly Asp Gln Arg Leu Asn Pro Thr Val Thr Tyr Gly Asn

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230

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gac tcc ttc tcg gcc aag gcc tca gtc agt gtg acc gca gag gac gag 768

Asp Ser Phe Ser Ala Lys Ala Ser Val Ser Val Thr Ala Glu Asp Glu

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ggc acc cag cgg ctg acg tgt gca gta ata ctg ggg aac cag agc cgg 816

Gly Thr Gln Arg Leu Thr Cys Ala Val Ile Leu Gly Asn Gln Ser Arg

260

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270

gag aca ctg cag aca gtg acc atc tac agc ttt ccg gcg ccc aac gtg 864

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|-----------------------------------------------------------------|------|
| Glu Thr Leu Gln Thr Val Thr Ile Tyr Ser Phe Pro Ala Pro Asn Val | |
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| att ctg acg aag cca gag gtc tca gaa ggg acc gag gtg aca gtg aag | 912 |
| Ile Leu Thr Lys Pro Glu Val Ser Glu Gly Thr Glu Val Thr Val Lys | |
| 290 | 295 |
| 300 | |
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| tgt gag gcc cac cct aga gcc aag gtg acg ctg aat ggg gtt cca gcc | 960 |
| Cys Glu Ala His Pro Arg Ala Lys Val Thr Leu Asn Gly Val Pro Ala | |
| 305 | 310 |
| 315 | 320 |
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| cag cca gtg ggc ccg agg gtc cag ctc ctg ctg aag gcc acc cca gag | 1008 |
| Gln Pro Val Gly Pro Arg Val Gln Leu Leu Leu Lys Ala Thr Pro Glu | |
| 325 | 330 |
| 335 | |
| | |
| gac aac ggg cgc agc ttc tcc tgc tct gca acc ctg gag gtg gcc ggc | 1056 |
| Asp Asn Gly Arg Ser Phe Ser Cys Ser Ala Thr Leu Glu Val Ala Gly | |
| 340 | 345 |
| 350 | |
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| cag ctt ata cac aag aac cag acc cgg gag ctt cgt gtc ctg tat ggc | 1104 |
| Gln Leu Ile His Lys Asn Gln Thr Arg Glu Leu Arg Val Leu Tyr Gly | |
| 355 | 360 |
| 365 | |
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| ccc cga ctg gac gag agg gat tgt ccg gga aac tgg acg tgg cca gaa | 1152 |
| Pro Arg Leu Asp Glu Arg Asp Cys Pro Gly Asn Trp Thr Trp Pro Glu | |
| 370 | 375 |
| 380 | |
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| aat tcc cag cag act cca atg tgc cag gct tcg ggg aac cca ttg ccc | 1200 |
| Asn Ser Gln Gln Thr Pro Met Cys Gln Ala Ser Gly Asn Pro Leu Pro | |

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| gag ctc aag tgt cta aag gat ggc act ttc cca ctg ccc gtc ggg gaa | | | | 1248 |
| Glu Leu Lys Cys Leu Lys Asp Gly Thr Phe Pro Leu Pro Val Gly Glu | | | | |
| | 405 | 410 | 415 | |
| tca gtg act gtc act cga gat ctt gag ggc acc tac ctc tgt cgg gcc | | | | 1296 |
| Ser Val Thr Val Thr Arg Asp Leu Glu Gly Thr Tyr Leu Cys Arg Ala | | | | |
| | 420 | 425 | 430 | |
| agg agc act caa ggg gag gtc acc cgc aag gtg acc gtg aat gtg ctc | | | | 1344 |
| Arg Ser Thr Gln Gly Glu Val Thr Arg Lys Val Thr Val Asn Val Leu | | | | |
| | 435 | 440 | 445 | |
| tcc ccc cgg tat gag att gtc atc atc act gtg gta gca gcc gca gtc | | | | 1392 |
| Ser Pro Arg Tyr Glu Ile Val Ile Ile Thr Val Val Ala Ala Ala Val | | | | |
| | 450 | 455 | 460 | |
| ata atg ggc act gca ggc ctc agc acg tac ctc tat aac cgc cag cgg | | | | 1440 |
| Ile Met Gly Thr Ala Gly Leu Ser Thr Tyr Leu Tyr Asn Arg Gln Arg | | | | |
| 465 | 470 | 475 | 480 | |
| aag atc agg aaa tac aga cta caa cag gct caa aaa ggg acc ccc atg | | | | 1488 |
| Lys Ile Arg Lys Tyr Arg Leu Gln Gln Ala Gln Lys Gly Thr Pro Met | | | | |
| | 485 | 490 | 495 | |
| aaa ccg aac aca caa gcc acg cct ccc tga | | | | 1518 |
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<213> Pan troglodytes

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Ile Glu Thr Pro Leu Pro Lys Lys Glu Leu Leu Leu Gly Gly Asn Asn

35

40

45

Trp Lys Val Tyr Glu Leu Ser Asn Val Gln Glu Asp Ser Gln Pro Met

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55

60

Cys Tyr Ser Asn Cys Pro Asp Gly Gln Ser Thr Ala Lys Thr Phe Leu

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70

75

80

Thr Val Tyr Trp Thr Pro Glu Arg Val Glu Leu Ala Pro Leu Pro Ser

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95

Trp Gln Pro Val Gly Lys Asp Leu Thr Leu Arg Cys Gln Val Glu Gly

100

105

110

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| Gly Thr Gln Arg Leu Thr Cys Ala Val Ile Leu Gly Asn Gln Ser Arg | | | |
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| Glu Thr Leu Gln Thr Val Thr Ile Tyr Ser Phe Pro Ala Pro Asn Val | | | |
| 275 | 280 | 285 | |
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| Ile Leu Thr Lys Pro Glu Val Ser Glu Gly Thr Glu Val Thr Val Lys | | | |
| 290 | 295 | 300 | |
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| Cys Glu Ala His Pro Arg Ala Lys Val Thr Leu Asn Gly Val Pro Ala | | | |
| 305 | 310 | 315 | 320 |
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| Gln Pro Val Gly Pro Arg Val Gln Leu Leu Leu Lys Ala Thr Pro Glu | | | |
| 325 | 330 | 335 | |
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| Asp Asn Gly Arg Ser Phe Ser Cys Ser Ala Thr Leu Glu Val Ala Gly | | | |
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| Gln Leu Ile His Lys Asn Gln Thr Arg Glu Leu Arg Val Leu Tyr Gly | | | |
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| Pro Arg Leu Asp Glu Arg Asp Cys Pro Gly Asn Trp Thr Trp Pro Glu | | | |
| 370 | 375 | 380 | |
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| Asn Ser Gln Gln Thr Pro Met Cys Gln Ala Ser Gly Asn Pro Leu Pro | | | |
| 385 | 390 | 395 | 400 |
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| Glu Leu Lys Cys Leu Lys Asp Gly Thr Phe Pro Leu Pro Val Gly Glu | | | |
| 405 | 410 | 415 | |

Ser Val Thr Val Thr Arg Asp Leu Glu Gly Thr Tyr Leu Cys Arg Ala

420

425

430

Arg Ser Thr Gln Gly Glu Val Thr Arg Lys Val Thr Val Asn Val Leu

435

440

445

Ser Pro Arg Tyr Glu Ile Val Ile Ile Thr Val Val Ala Ala Ala Val

450

455

460

Ile Met Gly Thr Ala Gly Leu Ser Thr Tyr Leu Tyr Asn Arg Gln Arg

465

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Lys Ile Arg Lys Tyr Arg Leu Gln Gln Ala Gln Lys Gly Thr Pro Met

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Lys Pro Asn Thr Gln Ala Thr Pro Pro

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Ile Glu Thr Pro Leu Pro Lys Lys Glu Leu Leu Leu Pro Gly Asn Asn

35

40

45

Arg Lys Val Tyr Glu Leu Ser Asn Val Gln Glu Asp Ser Gln Pro Met

50

55

60

Cys Tyr Ser Asn Cys Pro Asp Gly Gln Ser Thr Ala Lys Thr Phe Leu

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70

75

80

Thr Val Tyr Trp Thr Pro Glu Arg Val Glu Leu Ala Pro Leu Pro Ser

85

90

95

Trp Gln Pro Val Gly Lys Asn Leu Thr Leu Arg Cys Gln Val Glu Gly

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105

110

Gly Ala Pro Arg Ala Asn Leu Thr Val Val Leu Leu Arg Gly Glu Lys

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Glu Leu Lys Arg Glu Pro Ala Val Gly Glu Pro Ala Glu Val Thr Thr

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135

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Thr Val Leu Val Arg Arg Asp His His Gly Ala Asn Phe Ser Cys Arg
 145 150 155 160

Thr Glu Leu Asp Leu Arg Pro Gln Gly Leu Glu Leu Phe Glu Asn Thr
 165 170 175

Ser Ala Pro Tyr Gln Leu Gln Thr Phe Val Leu Pro Ala Thr Pro Pro
 180 185 190

Gln Leu Val Ser Pro Arg Val Leu Glu Val Asp Thr Gln Gly Thr Val
 195 200 205

Val Cys Ser Leu Asp Gly Leu Phe Pro Val Ser Glu Ala Gln Val His
 210 215 220

Leu Ala Leu Gly Asp Gln Arg Leu Asn Pro Thr Val Thr Tyr Gly Asn
 225 230 235 240

Asp Ser Phe Ser Ala Lys Ala Ser Val Ser Val Thr Ala Glu Asp Glu
 245 250 255

Gly Thr Gln Arg Leu Thr Cys Ala Val Ile Leu Gly Asn Gln Ser Gln
 260 265 270

Glu Thr Leu Gln Thr Val Thr Ile Tyr Ser Phe Pro Ala Pro Asn Val
 275 280 285

Ile Leu Thr Lys Pro Glu Val Ser Glu Gly Thr Glu Val Thr Val Lys

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| Cys Glu Ala His Pro Arg Ala Lys Val Thr Leu Asn Gly Val Pro Ala | | | |
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| Gln Pro Leu Gly Pro Arg Ala Gln Leu Leu Leu Lys Ala Thr Pro Glu | | | |
| | 325 | 330 | 335 |
| Asp Asn Gly Arg Ser Phe Ser Cys Ser Ala Thr Leu Glu Val Ala Gly | | | |
| | 340 | 345 | 350 |
| Gln Leu Ile His Lys Asn Gln Thr Arg Glu Leu Arg Val Leu Tyr Gly | | | |
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| Pro Arg Leu Asp Glu Arg Asp Cys Pro Gly Asn Trp Thr Trp Pro Glu | | | |
| | 370 | 375 | 380 |
| Asn Ser Gln Gln Thr Pro Met Cys Gln Ala Trp Gly Asn Pro Leu Pro | | | |
| 385 | 390 | 395 | 400 |
| Glu Leu Lys Cys Leu Lys Asp Gly Thr Phe Pro Leu Pro Ile Gly Glu | | | |
| | 405 | 410 | 415 |
| Ser Val Thr Val Thr Arg Asp Leu Glu Gly Thr Tyr Leu Cys Arg Ala | | | |
| | 420 | 425 | 430 |
| Arg Ser Thr Gln Gly Glu Val Thr Arg Glu Val Thr Val Asn Val Leu | | | |
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Ser Pro Arg Tyr Glu Ile Val Ile Ile Thr Val Val Ala Ala Ala Val
450 455 460

Ile Met Gly Thr Ala Gly Leu Ser Thr Tyr Leu Tyr Asn Arg Gln Arg
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Lys Pro Asn Thr Gln Ala Thr Pro Pro
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<212> PRT

<213> Homo sapiens

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Gln Pro Glu Val Gly Gly Leu Glu Thr Ser Leu Asp Lys Ile Leu Leu
35 40 45

Asp Glu Gln Ala Gln Trp Lys His Tyr Leu Val Ser Asn Ile Ser His
 50 55 60

Asp Thr Val Leu Gln Cys His Phe Thr Cys Ser Gly Lys Gln Glu Ser
 65 70 75 80

Met Asn Ser Asn Val Ser Val Tyr Gln Pro Pro Arg Gln Val Ile Leu
 85 90 95

Thr Leu Gln Pro Thr Leu Val Ala Val Gly Lys Ser Phe Thr Ile Glu
 100 105 110

Cys Arg Val Pro Thr Val Glu Pro Leu Asp Ser Leu Thr Leu Phe Leu
 115 120 125

Phe Arg Gly Asn Glu Thr Leu His Tyr Glu Thr Phe Gly Lys Ala Ala
 130 135 140

Pro Ala Pro Gln Glu Ala Thr Ala Thr Phe Asn Ser Thr Ala Asp Arg
 145 150 155 160

Glu Asp Gly His Arg Asn Phe Ser Cys Leu Ala Val Leu Asp Leu Met
 165 170 175

Ser Arg Gly Gly Asn Ile Phe His Lys His Ser Ala Pro Lys Met Leu
 180 185 190

Glu Ile Tyr Glu Pro Val Ser Asp Ser Gln Met Val Ile Ile Val Thr
 195 200 205

Val Val Ser Val Leu Leu Ser Leu Phe Val Thr Ser Val Leu Leu Cys
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<212> PRT

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35 40 45

Met Gly Trp Ala Ala Phe Asn Leu Ser Asn Val Thr Gly Asn Ser Arg
50 55 60

Ile Leu Cys Ser Val Tyr Cys Asn Gly Ser Gln Ile Thr Gly Ser Ser
65 70 75 80

Asn Ile Thr Val Tyr Gly Leu Pro Glu Arg Val Glu Leu Ala Pro Leu
85 90 95

Pro Pro Trp Gln Pro Val Gly Gln Asn Phe Thr Leu Arg Cys Gln Val
100 105 110

Glu Gly Gly Ser Pro Arg Thr Ser Leu Thr Val Val Leu Leu Arg Trp
115 120 125

Glu Glu Glu Leu Ser Arg Gln Pro Ala Val Glu Glu Pro Ala Glu Val
130 135 140

Thr Ala Thr Val Leu Ala Ser Arg Asp Asp His Gly Ala Pro Phe Ser
145 150 155 160

Cys Arg Thr Glu Leu Asp Met Gln Pro Gln Gly Leu Gly Leu Phe Val
165 170 175

Asn Thr Ser Ala Pro Arg Gln Leu Arg Thr Phe Val Leu Pro Val Thr
180 185 190

Pro Pro Arg Leu Val Ala Pro Arg Phe Leu Glu Val Glu Thr Ser Trp
195 200 205

Pro Val Asp Cys Thr Leu Asp Gly Leu Phe Pro Ala Ser Glu Ala Gln

| | | | |
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| 210 | 215 | 220 | |
| Val Tyr Leu Ala Leu Gly Asp Gln Met Leu Asn Ala Thr Val Met Asn | | | |
| 225 | 230 | 235 | 240 |
| His Gly Asp Thr Leu Thr Ala Thr Ala Thr Ala Thr Ala Arg Ala Asp | | | |
| 245 | 250 | 255 | |
| Gln Glu Gly Ala Arg Glu Ile Val Cys Asn Val Thr Leu Gly Gly Glu | | | |
| 260 | 265 | 270 | |
| Arg Arg Glu Ala Arg Glu Asn Leu Thr Val Phe Ser Phe Leu Gly Pro | | | |
| 275 | 280 | 285 | |
| Ile Val Asn Leu Ser Glu Pro Thr Ala His Glu Gly Ser Thr Val Thr | | | |
| 290 | 295 | 300 | |
| Val Ser Cys Met Ala Gly Ala Arg Val Gln Val Thr Leu Asp Gly Val | | | |
| 305 | 310 | 315 | 320 |
| Pro Ala Ala Ala Pro Gly Gln Pro Ala Gln Leu Gln Leu Asn Ala Thr | | | |
| 325 | 330 | 335 | |
| Glu Ser Asp Asp Gly Arg Ser Phe Phe Cys Ser Ala Thr Leu Glu Val | | | |
| 340 | 345 | 350 | |
| Asp Gly Glu Phe Leu His Arg Asn Ser Ser Val Gln Leu Arg Val Leu | | | |
| 355 | 360 | 365 | |

Tyr Gly Pro Lys Ile Asp Arg Ala Thr Cys Pro Gln His Leu Lys Trp
370 375 380

Lys Asp Lys Thr Arg His Val Leu Gln Cys Gln Ala Arg Gly Asn Pro
385 390 395 400

Tyr Pro Glu Leu Arg Cys Leu Lys Glu Gly Ser Ser Arg Glu Val Pro
405 410 415

Val Gly Ile Pro Phe Phe Val Asn Val Thr His Asn Gly Thr Tyr Gln
420 425 430

Cys Gln Ala Ser Ser Ser Arg Gly Lys Tyr Thr Leu Val Val Val Met
435 440 445

Asp Ile Glu Ala Gly Ser Ser His Phe Val Pro Val Phe Val Ala Val
450 455 460

Leu Leu Thr Leu Gly Val Val Thr Ile Val Leu Ala Leu Met Tyr Val
465 470 475 480

Phe Arg Glu His Gln Arg Ser Gly Ser Tyr His Val Arg Glu Glu Ser
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Thr Tyr Leu Pro Leu Thr Ser Met Gln Pro Thr Glu Ala Met Gly Glu
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<213> Homo sapiens

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<211> 1212

<212> DNA

<213> Pan troglodytes

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<212> DNA

<213> Gorilla gorilla

<400> 11

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<211> 105

<212> PRT

<213> Pan troglodytes

<400> 12

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Gly Leu Gln Val Tyr Asn Lys Cys Trp Lys Phe Glu His Cys Asn Phe

35 40 45

Asn Asp Val Thr Thr Arg Leu Arg Glu Asn Glu Leu Thr Tyr Tyr Cys

50 55 60

Cys Lys Lys Asp Leu Cys Asn Phe Asn Glu Gln Leu Glu Asn Gly Gly

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Ala Ala Ala Ala Trp Ser Leu His Pro
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<210> 13

<211> 121

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<213> Pan troglodytes

<400> 13

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Ala Val Asn Cys Ser Ser Asp Phe Asp Ala Cys Leu Ile Thr Lys Ala
20 25 30

Gly Leu Gln Val Tyr Asn Lys Cys Trp Lys Leu Glu His Cys Asn Phe
35 40 45

Lys Asp Leu Thr Thr Arg Leu Arg Glu Asn Glu Leu Thr Tyr Tyr Cys
50 55 60

Cys Lys Lys Asp Leu Cys Asn Phe Asn Glu Gln Leu Glu Asn Gly Gly
65 70 75 80

Asn Glu Gln Leu Glu Asn Gly Gly Asn Glu Gln Leu Glu Asn Gly Gly

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90

95

Thr Ser Leu Ser Glu Lys Thr Val Leu Leu Arg Val Thr Pro Phe Leu

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105

110

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115

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<211> 5140

<212> DNA

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<400> 14

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<212> DNA

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<400> 15

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5

10

15

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Leu Gln Cys Leu Ala Gln Cys Ala Glu Val Thr Pro Tyr Leu Leu Val

20

25

30

atg gag ttc tgc cca ctg ggg gac ctc aag ggc tac ctg cgg agc tgc 562

Met Glu Phe Cys Pro Leu Gly Asp Leu Lys Gly Tyr Leu Arg Ser Cys

35

40

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50

cgg gtg gcg gag tcc atg gct ccc gac ccc cgg acc ctg cag cgc atg 610

Arg Val Ala Glu Ser Met Ala Pro Asp Pro Arg Thr Leu Gln Arg Met

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gcc tgt gag gtg gcc tgt ggc gtc ctg cac ctt cat cgc aac aat ttc 658

Ala Cys Glu Val Ala Cys Gly Val Leu His Leu His Arg Asn Asn Phe

70

75

80

gtg cac agc gac ctg gcc ctg cgg aac tgc ctg ctc acg gct gac ctg 706

Val His Ser Asp Leu Ala Leu Arg Asn Cys Leu Leu Thr Ala Asp Leu

85

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95

acg gtg aag att ggt gac tat ggc ctg gct cac tgc aag tac aga gag 754

Thr Val Lys Ile Gly Asp Tyr Gly Leu Ala His Cys Lys Tyr Arg Glu

100

105

110

gac tac ttc gtg act gcc gac cag ctg tgg gtg cct ctg cgc tgg atc 802

Asp Tyr Phe Val Thr Ala Asp Gln Leu Trp Val Pro Leu Arg Trp Ile

115

120

125

130

gcg cca gag ctg gtg gac gag gtg cat agc aac ctg ctc gtc gtg gac 850

Ala Pro Glu Leu Val Asp Glu Val His Ser Asn Leu Leu Val Val Asp

135

140

145

cag acc aag agc ggg aat gtg tgg tcc ctg ggc gtg acc atc tgg gag 898

Gln Thr Lys Ser Gly Asn Val Trp Ser Leu Gly Val Thr Ile Trp Glu

150

155

160

ctc ttt gag ctg ggc acg cag ccc tat ccc cag cac tcg gac cag cag 946

Leu Phe Glu Leu Gly Thr Gln Pro Tyr Pro Gln His Ser Asp Gln Gln

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| Val Leu Ala Tyr Thr Val Arg Glu Gln Gln Leu Lys Leu Pro Lys Pro | | | |
| 180 | 185 | 190 | |
| cag ctg cag ctg acc ctg tcg gac cgc tgg tac gag gtg atg cag ttc | | | 1042 |
| Gln Leu Gln Leu Thr Leu Ser Asp Arg Trp Tyr Glu Val Met Gln Phe | | | |
| 195 | 200 | 205 | 210 |
| tgc tgg ctg cag ccc gag cag cgg ccc aca gcc gag gag gtg cac ctg | | | 1090 |
| Cys Trp Leu Gln Pro Glu Gln Arg Pro Thr Ala Glu Glu Val His Leu | | | |
| | 215 | 220 | 225 |
| ctg ctg tcc tac ctg tgt gcc aag ggc gcc acc gaa gca gag gag gag | | | 1138 |
| Leu Leu Ser Tyr Leu Cys Ala Lys Gly Ala Thr Glu Ala Glu Glu Glu | | | |
| 230 | 235 | 240 | |
| ttt gaa cgg cgc tgg cgc tct ctg cgg ccc ggc ggg ggc ggc gtg ggg | | | 1186 |
| Phe Glu Arg Arg Trp Arg Ser Leu Arg Pro Gly Gly Gly Gly Val Gly | | | |
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| ccc ggg ccc ggt gcg gcg ggg ccc atg ctg ggc ggc gtg gtg gag ctc | | | 1234 |
| Pro Gly Pro Gly Ala Ala Gly Pro Met Leu Gly Gly Val Val Glu Leu | | | |
| 260 | 265 | 270 | |
| gcc gct gcc tcg tcc ttc ccg ctg ctg gag cag ttc gcg ggc gac ggc | | | 1282 |
| Ala Ala Ala Ser Ser Phe Pro Leu Leu Glu Gln Phe Ala Gly Asp Gly | | | |

| | | | | |
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| 275 | 280 | 285 | 290 | |
| ttc cac gcg gac ggc gac gac gtg ctg acg gtg acc gag acc agc cga | | | | 1330 |
| Phe His Ala Asp Gly Asp Asp Val Leu Thr Val Thr Glu Thr Ser Arg | | | | |
| | 295 | 300 | 305 | |
| ggc ctc aat ttt gag tac aag tgg gag gcg ggc cgc ggc gcg gag gcc | | | | 1378 |
| Gly Leu Asn Phe Glu Tyr Lys Trp Glu Ala Gly Arg Gly Ala Glu Ala | | | | |
| | 310 | 315 | 320 | |
| ttc ccg gcc acg ctg agc cct ggc cgc acc gca cgc ctg cag gag ctg | | | | 1426 |
| Phe Pro Ala Thr Leu Ser Pro Gly Arg Thr Ala Arg Leu Gln Glu Leu | | | | |
| | 325 | 330 | 335 | |
| tgc gcc ccc gac ggc gcg ccc ccg ggc gtg gtt ccg gtg ctc agc gcg | | | | 1474 |
| Cys Ala Pro Asp Gly Ala Pro Pro Gly Val Val Pro Val Leu Ser Ala | | | | |
| | 340 | 345 | 350 | |
| cac agc ccg tcg ctg ggc agc gag tac ttc atc cgc cta gag gag gcc | | | | 1522 |
| His Ser Pro Ser Leu Gly Ser Glu Tyr Phe Ile Arg Leu Glu Glu Ala | | | | |
| 355 | 360 | 365 | 370 | |
| gca ccc gcc gcc ggc cac gac cct gac tgc gcc ggc tgc gcc ccc agt | | | | 1570 |
| Ala Pro Ala Ala Gly His Asp Pro Asp Cys Ala Gly Cys Ala Pro Ser | | | | |
| | 375 | 380 | 385 | |
| cca cct gcc acc gcg gac cag gac gac gac tct gac ggc agc acc gcc | | | | 1618 |
| Pro Pro Ala Thr Ala Asp Gln Asp Asp Asp Ser Asp Gly Ser Thr Ala | | | | |
| | 390 | 395 | 400 | |

gcc tcg ctg gcc atg gag ccg ctg ctg ggc cac ggg cca ccc gtc gac 1666
 Ala Ser Leu Ala Met Glu Pro Leu Leu Gly His Gly Pro Pro Val Asp

405

410

415

gtc ccc tgg ggc cgc ggc gac cac tac cct cgc aga agc ttg gcg cgg 1714
 Val Pro Trp Gly Arg Gly Asp His Tyr Pro Arg Arg Ser Leu Ala Arg

420

425

430

gac ccg ctc tgc ccc tca cgc tct ccc tcg ccc tcg gcg ggg ccc ctg 1762
 Asp Pro Leu Cys Pro Ser Arg Ser Pro Ser Pro Ser Ala Gly Pro Leu

435

440

445

450

agt ctg gcg gag gga gga gcg gag gat gca gac tgg ggc gtg gcc gcc 1810
 Ser Leu Ala Glu Gly Gly Ala Glu Asp Ala Asp Trp Gly Val Ala Ala

455

460

465

ttc tgt cct gcc ttc ttc gag gac cca ctg ggc acg tcc cct ttg ggg 1858
 Phe Cys Pro Ala Phe Phe Glu Asp Pro Leu Gly Thr Ser Pro Leu Gly

470

475

480

agc tca ggg gcg ccc ccg ctg ccg ctg act ggc gag gat gag cta gag 1906
 Ser Ser Gly Ala Pro Pro Leu Pro Leu Thr Gly Glu Asp Glu Leu Glu

485

490

495

gag gtg gga gcg cgg agg gcc gcc cag cgc ggg cac tgg cgc tcc aac 1954
 Glu Val Gly Ala Arg Arg Ala Ala Gln Arg Gly His Trp Arg Ser Asn

500

505

510

gtg tca gcc aac aac aac agc ggc agc cgc tgt cca gag tcc tgg gac 2002
 Val Ser Ala Asn Asn Asn Ser Gly Ser Arg Cys Pro Glu Ser Trp Asp
 515 520 525 530

ccc gtc tct gcg ggc tgc cac gct gag ggc tgc ccc agt cca aag cag 2050
 Pro Val Ser Ala Gly Cys His Ala Glu Gly Cys Pro Ser Pro Lys Gln
 535 540 545

acc cca cgg gcc tcc ccc gag ccg ggg tac cct gga gag cct ctg ctt 2098
 Thr Pro Arg Ala Ser Pro Glu Pro Gly Tyr Pro Gly Glu Pro Leu Leu
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ggg ctc cag gca gcc tct gcc cag gag cca ggc tgc tgc ccc ggc ctc 2146
 Gly Leu Gln Ala Ala Ser Ala Gln Glu Pro Gly Cys Cys Pro Gly Leu
 565 570 575

cct cat cta tgc tct gcc cag ggc ctg gca cct gct ccc tgc ctg gtt 2194
 Pro His Leu Cys Ser Ala Gln Gly Leu Ala Pro Ala Pro Cys Leu Val
 580 585 590

aca ccc tcc tgg aca gag aca gcc agt agt ggg ggt gac cac ccg cag 2242
 Thr Pro Ser Trp Thr Glu Thr Ala Ser Ser Gly Gly Asp His Pro Gln
 595 600 605 610

gca gag ccc aag ctt gcc acg gag gct gag ggc act acc gga ccc cgc 2290
 Ala Glu Pro Lys Leu Ala Thr Glu Ala Glu Gly Thr Thr Gly Pro Arg
 615 620 625

ctg ccc ctt cct tcc gtc ccc tcc cca tcc cag gag gga gcc cca ctt 2338

Leu Pro Leu Pro Ser Val Pro Ser Pro Ser Gln Glu Gly Ala Pro Leu

630

635

640

ccc tcg gag gag gcc agt gcc ccc gac gcc cct gat gcc ctg cct gac 2386

Pro Ser Glu Glu Ala Ser Ala Pro Asp Ala Pro Asp Ala Leu Pro Asp

645

650

655

tct ccc acg cct gct act ggt ggc gag gtg tct gcc atc aag ctg gct 2434

Ser Pro Thr Pro Ala Thr Gly Gly Glu Val Ser Ala Ile Lys Leu Ala

660

665

670

tct gcc ctg aat ggc agc agc agc tct ccc gag gtg gag gca ccc agc 2482

Ser Ala Leu Asn Gly Ser Ser Ser Ser Pro Glu Val Glu Ala Pro Ser

675

680

685

690

agt gag gat gag gac acg gct gag gcc acc tca ggc atc ttc acc gac 2530

Ser Glu Asp Glu Asp Thr Ala Glu Ala Thr Ser Gly Ile Phe Thr Asp

695

700

705

acg tcc agc gac ggc ctg cag gcc agg agg ccg gat gtg gtg cca gcc 2578

Thr Ser Ser Asp Gly Leu Gln Ala Arg Arg Pro Asp Val Val Pro Ala

710

715

720

ttc cgc tct ctg cag aag cag gtg ggg acc ccc gac tcc ctg gac tcc 2626

Phe Arg Ser Leu Gln Lys Gln Val Gly Thr Pro Asp Ser Leu Asp Ser

725

730

735

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| ctg gac atc ccg tcc tca gcc agt gat ggt ggc tat gag gtc ttc agc | 2674 |
| Leu Asp Ile Pro Ser Ser Ala Ser Asp Gly Gly Tyr Glu Val Phe Ser | |
| 740 745 750 | |
| | |
| ccg tcg gcc act ggc ccc tct gga ggg cag ccg cga gcg ctg gac agt | 2722 |
| Pro Ser Ala Thr Gly Pro Ser Gly Gly Gln Pro Arg Ala Leu Asp Ser | |
| 755 760 765 770 | |
| | |
| ggc tat gac acc gag aac tat gag tcc cct gag ttt gtg ctc aag gag | 2770 |
| Gly Tyr Asp Thr Glu Asn Tyr Glu Ser Pro Glu Phe Val Leu Lys Glu | |
| 775 780 785 | |
| | |
| gcg cag gaa ggg tgt gag ccc cag gcc ttt gcg gag ctg gcc tca gag | 2818 |
| Ala Gln Glu Gly Cys Glu Pro Gln Ala Phe Ala Glu Leu Ala Ser Glu | |
| 790 795 800 | |
| | |
| ggt gag ggc ccc ggg ccc gag aca cgg ctc tcc acc tcc ctc agt ggc | 2866 |
| Gly Glu Gly Pro Gly Pro Glu Thr Arg Leu Ser Thr Ser Leu Ser Gly | |
| 805 810 815 | |
| | |
| ctc aac gag aag aat ccc tac cga gac tct gcc tac ttc tca gac ctc | 2914 |
| Leu Asn Glu Lys Asn Pro Tyr Arg Asp Ser Ala Tyr Phe Ser Asp Leu | |
| 820 825 830 | |
| | |
| gag gct gag gcc gag gcc acc tca ggc cca gag aag aag tgc ggc ggg | 2962 |
| Glu Ala Glu Ala Glu Ala Thr Ser Gly Pro Glu Lys Lys Cys Gly Gly | |
| 835 840 845 850 | |
| | |
| gac cga gcc ccc ggg cca gag ctg ggc ctg ccg agc act ggg cag ccg | 3010 |

Asp Arg Ala Pro Gly Pro Glu Leu Gly Leu Pro Ser Thr Gly Gln Pro

855

860

865

tct gag cag gtc tgt ctc agg cct ggg gtt tcc ggg gag gca caa ggc 3058

Ser Glu Gln Val Cys Leu Arg Pro Gly Val Ser Gly Glu Ala Gln Gly

870

875

880

tct ggc ccc ggg gag gtg ctg ccc cca ctg ctg cag ctt gaa ggg tcc 3106

Ser Gly Pro Gly Glu Val Leu Pro Pro Leu Leu Gln Leu Glu Gly Ser

885

890

895

tcc cca gag ccc agc acc tgc ccc tcg ggc ctg gtc cca gag cct ccg 3154

Ser Pro Glu Pro Ser Thr Cys Pro Ser Gly Leu Val Pro Glu Pro Pro

900

905

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gag ccc caa ggc cca gcc aag gtg cgg cct ggg ccc agc ccc agc tgc 3202

Glu Pro Gln Gly Pro Ala Lys Val Arg Pro Gly Pro Ser Pro Ser Cys

915

920

925

930

tcc cag ttt ttc ctg ctg acc ccg gtt ccg ctg aga tca gaa ggc aac 3250

Ser Gln Phe Phe Leu Leu Thr Pro Val Pro Leu Arg Ser Glu Gly Asn

935

940

945

agc tct gag ttc cag ggg ccc cca gga ctg ttg tca ggg ccg gcc cca 3298

Ser Ser Glu Phe Gln Gly Pro Pro Gly Leu Leu Ser Gly Pro Ala Pro

950

955

960

caa aag cgg atg ggg ggc cca ggc acc ccc aga gcc cca ctc cgc ctg 3346

Gln Lys Arg Met Gly Gly Pro Gly Thr Pro Arg Ala Pro Leu Arg Leu

965

970

975

gct ctg ccc ggc ctc cct gcg gcc ttg gag ggc cgg ccg gag gag gag 3394

Ala Leu Pro Gly Leu Pro Ala Ala Leu Glu Gly Arg Pro Glu Glu Glu

980

985

990

gag gag gac agt gag gac agc gac gag tct gac gag gag ctc cgc tgc 3442

Glu Glu Asp Ser Glu Asp Ser Asp Glu Ser Asp Glu Glu Leu Arg Cys

995

1000

1005

1010

tac agc gtc cag gag cct agc gag gac agc gaa gag gag gcg ccg gcg 3490

Tyr Ser Val Gln Glu Pro Ser Glu Asp Ser Glu Glu Glu Ala Pro Ala

1015

1020

1025

gtg ccc gtg gtg gtg gct gag agc cag agc gcg cgc aac ctg cgc agc 3538

Val Pro Val Val Val Ala Glu Ser Gln Ser Ala Arg Asn Leu Arg Ser

1030

1035

1040

ctg ctc aag atg ccc agc ctg ctg tcc gag acc ttc tgc gag gac ctg 3586

Leu Leu Lys Met Pro Ser Leu Leu Ser Glu Thr Phe Cys Glu Asp Leu

1045

1050

1055

gaa cgc aag aag aag gcc gtg tcc ttc ttc gac gac gtc acc gtc tac 3634

Glu Arg Lys Lys Lys Ala Val Ser Phe Phe Asp Asp Val Thr Val Tyr

1060

1065

1070

ctc ttt gac cag gaa agc ccc acc cgg gag ctc ggg gag ccc ttc ccg 3682

Leu Phe Asp Gln Glu Ser Pro Thr Arg Glu Leu Gly Glu Pro Phe Pro

| | | | | |
|-----------------------------------------------------------------|------|------|------|------|
| 1075 | 1080 | 1085 | 1090 | |
| ggc gcc aag gaa tcg ccc cct acg ttc ctt agg ggg agc ccc ggc tct | | | | 3730 |
| Gly Ala Lys Glu Ser Pro Pro Thr Phe Leu Arg Gly Ser Pro Gly Ser | | | | |
| | 1095 | 1100 | 1105 | |
| ccc agc gcc ccc aac cgg ccg cag cag gct gat ggc tcc cca aat ggc | | | | 3778 |
| Pro Ser Ala Pro Asn Arg Pro Gln Gln Ala Asp Gly Ser Pro Asn Gly | | | | |
| | 1110 | 1115 | 1120 | |
| tcc aca gcg gaa gag ggt ggt ggg ttc gcg tgg gac gac gac ttc ccg | | | | 3826 |
| Ser Thr Ala Glu Glu Gly Gly Gly Phe Ala Trp Asp Asp Asp Phe Pro | | | | |
| | 1125 | 1130 | 1135 | |
| ctg atg acg gcc aag gca gcc ttc gcc atg gcc cta gac ccg gcc gca | | | | 3874 |
| Leu Met Thr Ala Lys Ala Ala Phe Ala Met Ala Leu Asp Pro Ala Ala | | | | |
| | 1140 | 1145 | 1150 | |
| ccc gcc ccg gct gcg ccc acg ccc acg ccc gct ccc ttc tcg cgc ttc | | | | 3922 |
| Pro Ala Pro Ala Ala Pro Thr Pro Thr Pro Ala Pro Phe Ser Arg Phe | | | | |
| 1155 | 1160 | 1165 | 1170 | |
| acg gtg tcg ccc gcg ccc acg tcc cgc ttc tcc atc acg cac gtg tct | | | | 3970 |
| Thr Val Ser Pro Ala Pro Thr Ser Arg Phe Ser Ile Thr His Val Ser | | | | |
| | 1175 | 1180 | 1185 | |
| gac tcg gac gcc gag tcc aag aga gga cct gaa gct ggt gcc ggg ggt | | | | 4018 |
| Asp Ser Asp Ala Glu Ser Lys Arg Gly Pro Glu Ala Gly Ala Gly Gly | | | | |

1190

1195

1200

gag agt aaa gag gct tga gacctgggca gtcctgccc ctcaaggctg 4066

Glu Ser Lys Glu Ala

1205

gcgtcaccgg agcccctgcc aggcagcagc gaggatgggtg accgagaagg tggggaccac 4126

gtcctgggtgg ctgttggcag cagattcagg tgccctctgcc ccacgcggtg tcctggagaa 4186

gcccgtggga tgagaggccc tggatggtag atcggccatg ctccgcccc gaggcagaat 4246

togtctgggc ttttaggctt gctgctagcc cctgggggcg cctggagcca cagtgggtgt 4306

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gtcacagga cacttaaacc aggacgaggc atggccccga gacactggca ggtttgtgag 4486

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tttccccttc actgactcag ctagaccctg aagcccaccc tcccacagg gaacaggctg 4666

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Met Gln Phe Leu Glu Glu Val Gln Pro Tyr Arg Ala Leu Lys His Ser

1 5 10 15

Asn Leu Leu Gln Cys Leu Ala Gln Cys Ala Glu Val Thr Pro Tyr Leu

20 25 30

Leu Val Met Glu Phe Cys Pro Leu Gly Asp Leu Lys Gly Tyr Leu Arg

35 40 45

Ser Cys Arg Val Ala Glu Ser Met Ala Pro Asp Pro Arg Thr Leu Gln

50

55

60

Arg Met Ala Cys Glu Val Ala Cys Gly Val Leu His Leu His Arg Asn

65

70

75

80

Asn Phe Val His Ser Asp Leu Ala Leu Arg Asn Cys Leu Leu Thr Ala

85

90

95

Asp Leu Thr Val Lys Ile Gly Asp Tyr Gly Leu Ala His Cys Lys Tyr

100

105

110

Arg Glu Asp Tyr Phe Val Thr Ala Asp Gln Leu Trp Val Pro Leu Arg

115

120

125

Trp Ile Ala Pro Glu Leu Val Asp Glu Val His Ser Asn Leu Leu Val

130

135

140

Val Asp Gln Thr Lys Ser Gly Asn Val Trp Ser Leu Gly Val Thr Ile

145

150

155

160

Trp Glu Leu Phe Glu Leu Gly Thr Gln Pro Tyr Pro Gln His Ser Asp

165

170

175

Gln Gln Val Leu Ala Tyr Thr Val Arg Glu Gln Gln Leu Lys Leu Pro

180

185

190

Lys Pro Gln Leu Gln Leu Thr Leu Ser Asp Arg Trp Tyr Glu Val Met

| | | |
|-----------------------------------------------------------------|-----|---------|
| 195 | 200 | 205 |
| Gln Phe Cys Trp Leu Gln Pro Glu Gln Arg Pro Thr Ala Glu Glu Val | | |
| 210 | 215 | 220 |
| His Leu Leu Leu Ser Tyr Leu Cys Ala Lys Gly Ala Thr Glu Ala Glu | | |
| 225 | 230 | 235 240 |
| Glu Glu Phe Glu Arg Arg Trp Arg Ser Leu Arg Pro Gly Gly Gly Gly | | |
| 245 | 250 | 255 |
| Val Gly Pro Gly Pro Gly Ala Ala Gly Pro Met Leu Gly Gly Val Val | | |
| 260 | 265 | 270 |
| Glu Leu Ala Ala Ala Ser Ser Phe Pro Leu Leu Glu Gln Phe Ala Gly | | |
| 275 | 280 | 285 |
| Asp Gly Phe His Ala Asp Gly Asp Asp Val Leu Thr Val Thr Glu Thr | | |
| 290 | 295 | 300 |
| Ser Arg Gly Leu Asn Phe Glu Tyr Lys Trp Glu Ala Gly Arg Gly Ala | | |
| 305 | 310 | 315 320 |
| Glu Ala Phe Pro Ala Thr Leu Ser Pro Gly Arg Thr Ala Arg Leu Gln | | |
| 325 | 330 | 335 |
| Glu Leu Cys Ala Pro Asp Gly Ala Pro Pro Gly Val Val Pro Val Leu | | |
| 340 | 345 | 350 |

Ser Ala His Ser Pro Ser Leu Gly Ser Glu Tyr Phe Ile Arg Leu Glu

355

360

365

Glu Ala Ala Pro Ala Ala Gly His Asp Pro Asp Cys Ala Gly Cys Ala

370

375

380

Pro Ser Pro Pro Ala Thr Ala Asp Gln Asp Asp Asp Ser Asp Gly Ser

385

390

395

400

Thr Ala Ala Ser Leu Ala Met Glu Pro Leu Leu Gly His Gly Pro Pro

405

410

415

Val Asp Val Pro Trp Gly Arg Gly Asp His Tyr Pro Arg Arg Ser Leu

420

425

430

Ala Arg Asp Pro Leu Cys Pro Ser Arg Ser Pro Ser Pro Ser Ala Gly

435

440

445

Pro Leu Ser Leu Ala Glu Gly Gly Ala Glu Asp Ala Asp Trp Gly Val

450

455

460

Ala Ala Phe Cys Pro Ala Phe Phe Glu Asp Pro Leu Gly Thr Ser Pro

465

470

475

480

Leu Gly Ser Ser Gly Ala Pro Pro Leu Pro Leu Thr Gly Glu Asp Glu

485

490

495

Leu Glu Glu Val Gly Ala Arg Arg Ala Ala Gln Arg Gly His Trp Arg

| | | |
|-----------------------------------------------------------------|-----|-----|
| 500 | 505 | 510 |
| Ser Asn Val Ser Ala Asn Asn Asn Ser Gly Ser Arg Cys Pro Glu Ser | | |
| 515 | 520 | 525 |
| Trp Asp Pro Val Ser Ala Gly Cys His Ala Glu Gly Cys Pro Ser Pro | | |
| 530 | 535 | 540 |
| Lys Gln Thr Pro Arg Ala Ser Pro Glu Pro Gly Tyr Pro Gly Glu Pro | | |
| 545 | 550 | 555 |
| | | 560 |
| Leu Leu Gly Leu Gln Ala Ala Ser Ala Gln Glu Pro Gly Cys Cys Pro | | |
| 565 | 570 | 575 |
| Gly Leu Pro His Leu Cys Ser Ala Gln Gly Leu Ala Pro Ala Pro Cys | | |
| 580 | 585 | 590 |
| Leu Val Thr Pro Ser Trp Thr Glu Thr Ala Ser Ser Gly Gly Asp His | | |
| 595 | 600 | 605 |
| Pro Gln Ala Glu Pro Lys Leu Ala Thr Glu Ala Glu Gly Thr Thr Gly | | |
| 610 | 615 | 620 |
| Pro Arg Leu Pro Leu Pro Ser Val Pro Ser Pro Ser Gln Glu Gly Ala | | |
| 625 | 630 | 635 |
| | | 640 |
| Pro Leu Pro Ser Glu Glu Ala Ser Ala Pro Asp Ala Pro Asp Ala Leu | | |
| 645 | 650 | 655 |

Pro Asp Ser Pro Thr Pro Ala Thr Gly Gly Glu Val Ser Ala Ile Lys

660

665

670

Leu Ala Ser Ala Leu Asn Gly Ser Ser Ser Ser Pro Glu Val Glu Ala

675

680

685

Pro Ser Ser Glu Asp Glu Asp Thr Ala Glu Ala Thr Ser Gly Ile Phe

690

695

700

Thr Asp Thr Ser Ser Asp Gly Leu Gln Ala Arg Arg Pro Asp Val Val

705

710

715

720

Pro Ala Phe Arg Ser Leu Gln Lys Gln Val Gly Thr Pro Asp Ser Leu

725

730

735

Asp Ser Leu Asp Ile Pro Ser Ser Ala Ser Asp Gly Gly Tyr Glu Val

740

745

750

Phe Ser Pro Ser Ala Thr Gly Pro Ser Gly Gly Gln Pro Arg Ala Leu

755

760

765

Asp Ser Gly Tyr Asp Thr Glu Asn Tyr Glu Ser Pro Glu Phe Val Leu

770

775

780

Lys Glu Ala Gln Glu Gly Cys Glu Pro Gln Ala Phe Ala Glu Leu Ala

785

790

795

800

Ser Glu Gly Glu Gly Pro Gly Pro Glu Thr Arg Leu Ser Thr Ser Leu

| | | |
|-----------------------------------------------------------------|-----|-----|
| 805 | 810 | 815 |
| Ser Gly Leu Asn Glu Lys Asn Pro Tyr Arg Asp Ser Ala Tyr Phe Ser | | |
| 820 | 825 | 830 |
| Asp Leu Glu Ala Glu Ala Glu Ala Thr Ser Gly Pro Glu Lys Lys Cys | | |
| 835 | 840 | 845 |
| Gly Gly Asp Arg Ala Pro Gly Pro Glu Leu Gly Leu Pro Ser Thr Gly | | |
| 850 | 855 | 860 |
| Gln Pro Ser Glu Gln Val Cys Leu Arg Pro Gly Val Ser Gly Glu Ala | | |
| 865 | 870 | 875 |
| | | 880 |
| Gln Gly Ser Gly Pro Gly Glu Val Leu Pro Pro Leu Leu Gln Leu Glu | | |
| 885 | 890 | 895 |
| Gly Ser Ser Pro Glu Pro Ser Thr Cys Pro Ser Gly Leu Val Pro Glu | | |
| 900 | 905 | 910 |
| Pro Pro Glu Pro Gln Gly Pro Ala Lys Val Arg Pro Gly Pro Ser Pro | | |
| 915 | 920 | 925 |
| Ser Cys Ser Gln Phe Phe Leu Leu Thr Pro Val Pro Leu Arg Ser Glu | | |
| 930 | 935 | 940 |
| Gly Asn Ser Ser Glu Phe Gln Gly Pro Pro Gly Leu Leu Ser Gly Pro | | |
| 945 | 950 | 955 |
| | | 960 |

Ala Pro Gln Lys Arg Met Gly Gly Pro Gly Thr Pro Arg Ala Pro Leu
965 970 975

Arg Leu Ala Leu Pro Gly Leu Pro Ala Ala Leu Glu Gly Arg Pro Glu
980 985 990

Glu Glu Glu Glu Asp Ser Glu Asp Ser Asp Glu Ser Asp Glu Glu Leu
995 1000 1005

Arg Cys Tyr Ser Val Gln Glu Pro Ser Glu Asp Ser Glu Glu Glu Ala
1010 1015 1020

Pro Ala Val Pro Val Val Val Ala Glu Ser Gln Ser Ala Arg Asn Leu
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Arg Ser Leu Leu Lys Met Pro Ser Leu Leu Ser Glu Thr Phe Cys Glu
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Asp Leu Glu Arg Lys Lys Lys Ala Val Ser Phe Phe Asp Asp Val Thr
1060 1065 1070

Val Tyr Leu Phe Asp Gln Glu Ser Pro Thr Arg Glu Leu Gly Glu Pro
1075 1080 1085

Phe Pro Gly Ala Lys Glu Ser Pro Pro Thr Phe Leu Arg Gly Ser Pro
1090 1095 1100

Gly Ser Pro Ser Ala Pro Asn Arg Pro Gln Gln Ala Asp Gly Ser Pro

1105 1110 1115 1120

Asn Gly Ser Thr Ala Glu Glu Gly Gly Gly Phe Ala Trp Asp Asp Asp

1125 1130 1135

Phe Pro Leu Met Thr Ala Lys Ala Ala Phe Ala Met Ala Leu Asp Pro

1140 1145 1150

Ala Ala Pro Ala Pro Ala Ala Pro Thr Pro Thr Pro Ala Pro Phe Ser

1155 1160 1165

Arg Phe Thr Val Ser Pro Ala Pro Thr Ser Arg Phe Ser Ile Thr His

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Val Ser Asp Ser Asp Ala Glu Ser Lys Arg Gly Pro Glu Ala Gly Ala

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Gly Gly Glu Ser Lys Glu Ala

1205

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<211> 1785

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<213> Gorilla gorilla

<400> 18

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cccgaagccc ctgatgcctt gcctgactcg cccacgcctg ctactggtgg cgaggtgtct 240

gccaccaagc tggcttccgc cctgaatggc agcagcagct ctcccaggt ggaggcacc 300

agcagtgagg atgaggacac ggctgaggca acctcaggca tcttcaccga cacgtccagc 360

gacggcctgc aggccgagag gcaggatgtg gtgccagcct tccactctct gcagaagcag 420

gtgggggacc cgcactccct ggactccctg gacatccctg cctcagccag tgatggtggc 480

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<211> 18

<212> DNA

<213> Homo sapiens

<400> 20

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18

<210> 21

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<400> 21

ggcgagggcc ccgggccc

18

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<211> 24

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24

<210> 23

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ctggaggctg aggccgag 18

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<213> Pan troglodytes

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24

<210> 29

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<212> DNA

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<212> DNA

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cttgacagat gttgtaatca agggcctact ctaacagtga tttatagtga agatcatatt 180

attggagcat atgcagaaga ggggtaccag gmaagaaagt atgcttccat catccttttt 240

gcacttcaag agactaaaat ttcagaatgg aaactaggac tatatacacc agaaacactg 300

ttttgttgtg acgttgcaaa atataactcc ccaactaatt tccagataga tggaagaaat 360

agaaaagtga ttatggactt aaagacaatg gaaaatcttg gacttgctca aaattgtact 420

atctctattc aggattatga agtttttcga tgcgaagatt cactggacga aagaaagata 480
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 gtaaaggatg ttctaattct ttctgctctg agacgaatgc tatgggctgc agatgacttc 1260

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1335

<210> 32

<211> 1335

<212> DNA

<213> Pan troglodytes

<220>

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<223> M= A or C

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5

10

15

aat cat ttt gga ggg aag cgg ctt agc ctt ctc tat aag ggt agt gtc 96

Asn His Phe Gly Gly Lys Arg Leu Ser Leu Leu Tyr Lys Gly Ser Val

20

25

30

cat gga ttc cat aat gga gtt ttg ctt gac aga tgt tgt aat caa ggg 144

His Gly Phe His Asn Gly Val Leu Leu Asp Arg Cys Cys Asn Gln Gly

35

40

45

cct act cta aca gtg att tat agt gaa gat cat att att gga gca tat 192
 Pro Thr Leu Thr Val Ile Tyr Ser Glu Asp His Ile Ile Gly Ala Tyr

50

55

60

gca gaa gag ggt tac cag gma aga aag tat gct tcc atc atc ctt ttt 240
 Ala Glu Glu Gly Tyr Gln Xaa Arg Lys Tyr Ala Ser Ile Ile Leu Phe

65

70

75

80

gca ctt caa gag act aaa att tca gaa tgg aaa cta gga cta tat aca 288
 Ala Leu Gln Glu Thr Lys Ile Ser Glu Trp Lys Leu Gly Leu Tyr Thr

85

90

95

cca gaa aca ctg ttt tgt tgt gac gtt gca aaa tat aac tcc cca act 336
 Pro Glu Thr Leu Phe Cys Cys Asp Val Ala Lys Tyr Asn Ser Pro Thr

100

105

110

aat ttc cag ata gat gga aga aat aga aaa gtg att atg gac tta aag 384
 Asn Phe Gln Ile Asp Gly Arg Asn Arg Lys Val Ile Met Asp Leu Lys

115

120

125

aca atg gaa aat ctt gga ctt gct caa aat tgt act atc tct att cag 432
 Thr Met Glu Asn Leu Gly Leu Ala Gln Asn Cys Thr Ile Ser Ile Gln

130

135

140

gat tat gaa gtt ttt cga tgc gaa gat tca ctg gac gaa aga aag ata 480
 Asp Tyr Glu Val Phe Arg Cys Glu Asp Ser Leu Asp Glu Arg Lys Ile

145

150

155

160

aaa ggg gtc att gag ctc agg aag agc tta ctg tct gcc ttg aga act 528
 Lys Gly Val Ile Glu Leu Arg Lys Ser Leu Leu Ser Ala Leu Arg Thr

165 170 175

tat gaa cca tat gga tcc ctg gtt caa caa ata cga att ctg ctg ctg 576
 Tyr Glu Pro Tyr Gly Ser Leu Val Gln Gln Ile Arg Ile Leu Leu Leu

180 185 190

ggt cca att gga gct ggg aag tct agc ttt ttc aac tca gtg agg tct 624
 Gly Pro Ile Gly Ala Gly Lys Ser Ser Phe Phe Asn Ser Val Arg Ser

195 200 205

gtt ttc caa ggg cat gta acg cat cag gct ttg gtg ggc act aat aca 672
 Val Phe Gln Gly His Val Thr His Gln Ala Leu Val Gly Thr Asn Thr

210 215 220

act ggg ata tct gag aag tat agg aca tac tct att aga gac ggg aaa 720
 Thr Gly Ile Ser Glu Lys Tyr Arg Thr Tyr Ser Ile Arg Asp Gly Lys

225 230 235 240

gat ggc aaa tac ctg cca ttt att ctg tgt gac tca ctg ggg ctg agt 768
 Asp Gly Lys Tyr Leu Pro Phe Ile Leu Cys Asp Ser Leu Gly Leu Ser

245 250 255

gag aaa gaa ggc ggc ctg tgc atg gat gac ata tcc tac atc ttg aac 816
 Glu Lys Glu Gly Gly Leu Cys Met Asp Asp Ile Ser Tyr Ile Leu Asn

260 265 270

ggt aac att cgt gat aga tac cag ttt aat ccc atg gaa tca atc aaa 864
 Gly Asn Ile Arg Asp Arg Tyr Gln Phe Asn Pro Met Glu Ser Ile Lys
 275 280 285

tta aat cat cat gac tac att gat tcc cca tcg ctg aag gac aga att 912
 Leu Asn His His Asp Tyr Ile Asp Ser Pro Ser Leu Lys Asp Arg Ile
 290 295 300

cat tgt gtg gca ttt gta ttt gat gcc agc tct att gaa tac ttc tcc 960
 His Cys Val Ala Phe Val Phe Asp Ala Ser Ser Ile Glu Tyr Phe Ser
 305 310 315 320

tct cag atg ata gta aag atc aaa aga att cga agg gag ttg gta aac 1008
 Ser Gln Met Ile Val Lys Ile Lys Arg Ile Arg Arg Glu Leu Val Asn
 325 330 335

gct ggt gtg gta cat gtg gct ttg ctc act cat gtg gat agc atg gat 1056
 Ala Gly Val Val His Val Ala Leu Leu Thr His Val Asp Ser Met Asp
 340 345 350

ctg att aca aaa ggt gac ctt ata gaa ata gag aga tgt gtg cct gtg 1104
 Leu Ile Thr Lys Gly Asp Leu Ile Glu Ile Glu Arg Cys Val Pro Val
 355 360 365

agg tcc aag cta gag gaa gtc caa aga aaa ctt gga ttt gct ctt tct 1152
 Arg Ser Lys Leu Glu Glu Val Gln Arg Lys Leu Gly Phe Ala Leu Ser
 370 375 380

gac atc tcg gtg gtt agc aat tat tcc tct gag tgg gag ctg gac cct 1200
 Asp Ile Ser Val Val Ser Asn Tyr Ser Ser Glu Trp Glu Leu Asp Pro
 385 390 395 400

gta aag gat gtt cta att ctt tct gct ctg aga cga atg cta tgg gct 1248
 Val Lys Asp Val Leu Ile Leu Ser Ala Leu Arg Arg Met Leu Trp Ala
 405 410 415

gca gat gac ttc tta gag gat ttg cct ttt gag caa ata ggg aat cta 1296
 Ala Asp Asp Phe Leu Glu Asp Leu Pro Phe Glu Gln Ile Gly Asn Leu
 420 425 430

agg gag gaa att atc aac tgt gca caa gga aaa aaa tag 1335
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<210> 33

<211> 444

<212> PRT

<213> Pan troglodytes

<220>

<223> M= A or C

<400> 33

Met Ala Val Thr Thr Arg Leu Thr Trp Leu His Glu Lys Ile Leu Gln
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Asn His Phe Gly Gly Lys Arg Leu Ser Leu Leu Tyr Lys Gly Ser Val

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|-----------------------------------------------------------------|-----|----|-----|----|-----|
| | 20 | | 25 | | 30 |
| His Gly Phe His Asn Gly Val Leu Leu Asp Arg Cys Cys Asn Gln Gly | | | | | |
| | 35 | | 40 | | 45 |
| Pro Thr Leu Thr Val Ile Tyr Ser Glu Asp His Ile Ile Gly Ala Tyr | | | | | |
| | 50 | | 55 | | 60 |
| Ala Glu Glu Gly Tyr Gln Xaa Arg Lys Tyr Ala Ser Ile Ile Leu Phe | | | | | |
| | 65 | | 70 | | 75 |
| | | | | | 80 |
| Ala Leu Gln Glu Thr Lys Ile Ser Glu Trp Lys Leu Gly Leu Tyr Thr | | | | | |
| | | 85 | | 90 | 95 |
| Pro Glu Thr Leu Phe Cys Cys Asp Val Ala Lys Tyr Asn Ser Pro Thr | | | | | |
| | 100 | | 105 | | 110 |
| Asn Phe Gln Ile Asp Gly Arg Asn Arg Lys Val Ile Met Asp Leu Lys | | | | | |
| | 115 | | 120 | | 125 |
| Thr Met Glu Asn Leu Gly Leu Ala Gln Asn Cys Thr Ile Ser Ile Gln | | | | | |
| | 130 | | 135 | | 140 |
| Asp Tyr Glu Val Phe Arg Cys Glu Asp Ser Leu Asp Glu Arg Lys Ile | | | | | |
| | 145 | | 150 | | 155 |
| | | | | | 160 |
| Lys Gly Val Ile Glu Leu Arg Lys Ser Leu Leu Ser Ala Leu Arg Thr | | | | | |
| | 165 | | 170 | | 175 |

Tyr Glu Pro Tyr Gly Ser Leu Val Gln Gln Ile Arg Ile Leu Leu Leu

180

185

190

Gly Pro Ile Gly Ala Gly Lys Ser Ser Phe Phe Asn Ser Val Arg Ser

195

200

205

Val Phe Gln Gly His Val Thr His Gln Ala Leu Val Gly Thr Asn Thr

210

215

220

Thr Gly Ile Ser Glu Lys Tyr Arg Thr Tyr Ser Ile Arg Asp Gly Lys

225

230

235

240

Asp Gly Lys Tyr Leu Pro Phe Ile Leu Cys Asp Ser Leu Gly Leu Ser

245

250

255

Glu Lys Glu Gly Gly Leu Cys Met Asp Asp Ile Ser Tyr Ile Leu Asn

260

265

270

Gly Asn Ile Arg Asp Arg Tyr Gln Phe Asn Pro Met Glu Ser Ile Lys

275

280

285

Leu Asn His His Asp Tyr Ile Asp Ser Pro Ser Leu Lys Asp Arg Ile

290

295

300

His Cys Val Ala Phe Val Phe Asp Ala Ser Ser Ile Glu Tyr Phe Ser

305

310

315

320

Ser Gln Met Ile Val Lys Ile Lys Arg Ile Arg Arg Glu Leu Val Asn

| | | | |
|-----------------------------------------------------------------|-----|-----|-----|
| | 325 | 330 | 335 |
| Ala Gly Val Val His Val Ala Leu Leu Thr His Val Asp Ser Met Asp | | | |
| | 340 | 345 | 350 |
| Leu Ile Thr Lys Gly Asp Leu Ile Glu Ile Glu Arg Cys Val Pro Val | | | |
| | 355 | 360 | 365 |
| Arg Ser Lys Leu Glu Glu Val Gln Arg Lys Leu Gly Phe Ala Leu Ser | | | |
| | 370 | 375 | 380 |
| Asp Ile Ser Val Val Ser Asn Tyr Ser Ser Glu Trp Glu Leu Asp Pro | | | |
| | 385 | 390 | 395 |
| | | | 400 |
| Val Lys Asp Val Leu Ile Leu Ser Ala Leu Arg Arg Met Leu Trp Ala | | | |
| | 405 | 410 | 415 |
| Ala Asp Asp Phe Leu Glu Asp Leu Pro Phe Glu Gln Ile Gly Asn Leu | | | |
| | 420 | 425 | 430 |
| Arg Glu Glu Ile Ile Asn Cys Ala Gln Gly Lys Lys | | | |
| | 435 | 440 | |

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<211> 1335

<212> DNA

<213> Homo sapiens

<400> 34

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cttgacagat gttgtaatca agggcctact ctaacagtga tttatagtga agatcatatt 180

attggagcat atgcagaaga gagttaccag gaaggaaagt atgcttccat catccttttt 240

gcacttcaag atactaaaat ttcagaatgg aaactaggac tatgtacacc agaaacactg 300

ttttgttgat atgttacaaa atataactcc ccaactaatt tccagataga tggaagaaat 360

agaaaagtga ttatggactt aaagacaatg gaaaatcttg gacttgctca aaattgtact 420

atctctattc aggattatga agtttttcga tgcgaagatt cactggatga aagaaagata 480

aaaggggtca ttgagctcag gaagagctta ctgtctgcct tgagaactta tgaaccatat 540

ggatccctgg ttcaacaaat acgaattctc ctctgggtc caattggagc tccaagtcc 600

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ggcctgtgca gggatgacat attctatatc ttgaacggta acattcgtga tagataccag 840

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 gaaatagaga gatgtgagcc tgtgaggtcc aagctagagg aagtccaaag aaaacttgga 1140
 tttgctcttt ctgacatctc ggtgggttagc aattattcct ctgagtggga gctggaccct 1200
 gtaaaggatg ttctaattct ttctgctctg agacgaatgc tatgggctgc agatgacttc 1260
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<222> (1)..(1335)

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5

10

15

aat cat ttt gga ggg aag cgg ctt agc ctt ctc tat aag ggt agt gtc 96

Asn His Phe Gly Gly Lys Arg Leu Ser Leu Leu Tyr Lys Gly Ser Val

20

25

30

cat gga ttc cgt aat gga gtt ttg ctt gac aga tgt tgt aat caa ggg 144

His Gly Phe Arg Asn Gly Val Leu Leu Asp Arg Cys Cys Asn Gln Gly

35

40

45

cct act cta aca gtg att tat agt gaa gat cat att att gga gca tat 192

Pro Thr Leu Thr Val Ile Tyr Ser Glu Asp His Ile Ile Gly Ala Tyr

50

55

60

gca gaa gag agt tac cag gaa gga aag tat gct tcc atc atc ctt ttt 240

Ala Glu Glu Ser Tyr Gln Glu Gly Lys Tyr Ala Ser Ile Ile Leu Phe

65

70

75

80

gca ctt caa gat act aaa att tca gaa tgg aaa cta gga cta tgt aca 288

Ala Leu Gln Asp Thr Lys Ile Ser Glu Trp Lys Leu Gly Leu Cys Thr

85

90

95

cca gaa aca ctg ttt tgt tgt gat gtt aca aaa tat aac tcc cca act 336

Pro Glu Thr Leu Phe Cys Cys Asp Val Thr Lys Tyr Asn Ser Pro Thr

100

105

110

aat ttc cag ata gat gga aga aat aga aaa gtg att atg gac tta aag 384
 Asn Phe Gln Ile Asp Gly Arg Asn Arg Lys Val Ile Met Asp Leu Lys

115 120 125

aca atg gaa aat ctt gga ctt gct caa aat tgt act atc tct att cag 432
 Thr Met Glu Asn Leu Gly Leu Ala Gln Asn Cys Thr Ile Ser Ile Gln

130 135 140

gat tat gaa gtt ttt cga tgc gaa gat tca ctg gat gaa aga aag ata 480
 Asp Tyr Glu Val Phe Arg Cys Glu Asp Ser Leu Asp Glu Arg Lys Ile

145 150 155 160

aaa ggg gtc att gag ctc agg aag agc tta ctg tct gcc ttg aga act 528
 Lys Gly Val Ile Glu Leu Arg Lys Ser Leu Leu Ser Ala Leu Arg Thr

165 170 175

tat gaa cca tat gga tcc ctg gtt caa caa ata cga att ctc ctc ctg 576
 Tyr Glu Pro Tyr Gly Ser Leu Val Gln Gln Ile Arg Ile Leu Leu Leu

180 185 190

ggt cca att gga gct ccc aag tcc agc ttt ttc aac tca gtg agg tct 624
 Gly Pro Ile Gly Ala Pro Lys Ser Ser Phe Phe Asn Ser Val Arg Ser

195 200 205

gtt ttc caa ggg cat gta acg cat cag gct ttg gtg ggc act aat aca 672
 Val Phe Gln Gly His Val Thr His Gln Ala Leu Val Gly Thr Asn Thr

210 215 220

gct ggt gtg gta cat gtg gct ttg ctc act cat gtg gat agc atg gat 1056

Ala Gly Val Val His Val Ala Leu Leu Thr His Val Asp Ser Met Asp

340

345

350

ttg att aca aaa ggt gac ctt ata gaa ata gag aga tgt gag cct gtg 1104

Leu Ile Thr Lys Gly Asp Leu Ile Glu Ile Glu Arg Cys Glu Pro Val

355

360

365

agg tcc aag cta gag gaa gtc caa aga aaa ctt gga ttt gct ctt tct 1152

Arg Ser Lys Leu Glu Glu Val Gln Arg Lys Leu Gly Phe Ala Leu Ser

370

375

380

gac atc tcg gtg gtt agc aat tat tcc tct gag tgg gag ctg gac cct 1200

Asp Ile Ser Val Val Ser Asn Tyr Ser Ser Glu Trp Glu Leu Asp Pro

385

390

395

400

gta aag gat gtt cta att ctt tct gct ctg aga cga atg cta tgg gct 1248

Val Lys Asp Val Leu Ile Leu Ser Ala Leu Arg Arg Met Leu Trp Ala

405

410

415

gca gat gac ttc tta gag gat ttg cct ttt gag caa ata ggg aat cta 1296

Ala Asp Asp Phe Leu Glu Asp Leu Pro Phe Glu Gln Ile Gly Asn Leu

420

425

430

agg gag gaa att atc aac tgt gca caa gga aaa aaa tag 1335

Arg Glu Glu Ile Ile Asn Cys Ala Gln Gly Lys Lys

435

440

445

<210> 36

<211> 444

<212> PRT

<213> Homo sapiens

<400> 36

Met Ala Val Thr Thr Arg Leu Thr Trp Leu His Glu Lys Ile Leu Gln

1 5 10 15

Asn His Phe Gly Gly Lys Arg Leu Ser Leu Leu Tyr Lys Gly Ser Val

20 25 30

His Gly Phe Arg Asn Gly Val Leu Leu Asp Arg Cys Cys Asn Gln Gly

35 40 45

Pro Thr Leu Thr Val Ile Tyr Ser Glu Asp His Ile Ile Gly Ala Tyr

50 55 60

Ala Glu Glu Ser Tyr Gln Glu Gly Lys Tyr Ala Ser Ile Ile Leu Phe

65 70 75 80

Ala Leu Gln Asp Thr Lys Ile Ser Glu Trp Lys Leu Gly Leu Cys Thr

85 90 95

Pro Glu Thr Leu Phe Cys Cys Asp Val Thr Lys Tyr Asn Ser Pro Thr

100 105 110

Asn Phe Gln Ile Asp Gly Arg Asn Arg Lys Val Ile Met Asp Leu Lys

| | | | |
|-----------------------------------------------------------------|-----|-----|-----|
| 115 | 120 | 125 | |
| Thr Met Glu Asn Leu Gly Leu Ala Gln Asn Cys Thr Ile Ser Ile Gln | | | |
| 130 | 135 | 140 | |
| Asp Tyr Glu Val Phe Arg Cys Glu Asp Ser Leu Asp Glu Arg Lys Ile | | | |
| 145 | 150 | 155 | 160 |
| Lys Gly Val Ile Glu Leu Arg Lys Ser Leu Leu Ser Ala Leu Arg Thr | | | |
| 165 | 170 | 175 | |
| Tyr Glu Pro Tyr Gly Ser Leu Val Gln Gln Ile Arg Ile Leu Leu Leu | | | |
| 180 | 185 | 190 | |
| Gly Pro Ile Gly Ala Pro Lys Ser Ser Phe Phe Asn Ser Val Arg Ser | | | |
| 195 | 200 | 205 | |
| Val Phe Gln Gly His Val Thr His Gln Ala Leu Val Gly Thr Asn Thr | | | |
| 210 | 215 | 220 | |
| Thr Gly Ile Ser Glu Lys Tyr Arg Thr Tyr Ser Ile Arg Asp Gly Lys | | | |
| 225 | 230 | 235 | 240 |
| Asp Gly Lys Tyr Leu Pro Phe Ile Leu Cys Asp Ser Leu Gly Leu Ser | | | |
| 245 | 250 | 255 | |
| Glu Lys Glu Gly Gly Leu Cys Arg Asp Asp Ile Phe Tyr Ile Leu Asn | | | |
| 260 | 265 | 270 | |

Gly Asn Ile Arg Asp Arg Tyr Gln Phe Asn Pro Met Glu Ser Ile Lys

275

280

285

Leu Asn His His Asp Tyr Ile Asp Ser Pro Ser Leu Lys Asp Arg Ile

290

295

300

His Cys Val Ala Phe Val Phe Asp Ala Ser Ser Ile Gln Tyr Phe Ser

305

310

315

320

Ser Gln Met Ile Val Lys Ile Lys Arg Ile Gln Arg Glu Leu Val Asn

325

330

335

Ala Gly Val Val His Val Ala Leu Leu Thr His Val Asp Ser Met Asp

340

345

350

Leu Ile Thr Lys Gly Asp Leu Ile Glu Ile Glu Arg Cys Glu Pro Val

355

360

365

Arg Ser Lys Leu Glu Glu Val Gln Arg Lys Leu Gly Phe Ala Leu Ser

370

375

380

Asp Ile Ser Val Val Ser Asn Tyr Ser Ser Glu Trp Glu Leu Asp Pro

385

390

395

400

Val Lys Asp Val Leu Ile Leu Ser Ala Leu Arg Arg Met Leu Trp Ala

405

410

415

Ala Asp Asp Phe Leu Glu Asp Leu Pro Phe Glu Gln Ile Gly Asn Leu

420

425

430

Arg Glu Glu Ile Ile Asn Cys Ala Gln Gly Lys Lys

435

440